Case Reports

A REPORT ON THE SPRING-BALANCE MUSCLE TESTS AS DEVISED BY LOVETT

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THE subject of the after-treatment of poliomyelitis is particularly interesting at the present time on account of the vast amount of material resulting from the recent epidemic and the opportunity this has given for further investigation and advancement in treatment.

If we divide poliomyelitis into the usual three stages we have: (1) The acute stage, from the onset of the disease to the disappearance of all tenderness; (2) The stage of convalescence, beginning with the cessation of all tenderness and lasting two or more years, during which time there is a natural tendency to improvement of the affected muscles; (3) The stage when all natural improvement has ceased.

After-treatment, then, begins with the stage of convalescence and by judicious treatment the natural tendency to improvement may be aided, while deformity and atrophy are prevented or minimized. Many of the orthopædic operations undertaken in the third stage of the disease are necessitated by the deformity, atrophy or stretching of muscles resulting from improper or neglected treatment during convalescence.

Before beginning treatment it is necessary to make a thorough examination of all the muscles of the body to ascertain which have been affected. Certain groups of muscles which are not uncommonly involved are apt to be overlooked, especially those of the back, the abdomen, and the thumb, unless a systematic inventory is taken.

By the usual *manual* examination it is only possible to say that a muscle is apparently normal in power; partly paralyzed (i.e. weak, or paretic); or totally paralyzed.

About 90 per cent. of all muscles affected by poliomyelitis are only partly paralyzed and are capable of great improvement if

not complete recovery, especially if aided by proper methods of massage, muscle-training, etc. In this large group of paretic muscles there are all degrees of weakness, from those showing but a flicker of contraction to those just short of the normal.

Now Lovett and his co-workers in Boston felt the need of a more precise method than that afforded by mere manual impressions in order to determine the power still present in these muscles. In other words: instead of saying the power in a group of muscles was "poor" or "fair", they wanted to be able to state just what power was present and to record the fact in figures. By this means one obtains a precise record of the initial weakness of the muscles, which not only serves as a guide in commencing treatment but also as a criterion in estimating the improvement found at subsequent examinations.

Theoretically the principle is simple; practically there are many difficulties and pit-falls which greatly alter the readings. The test is based on the patient's power to hold a position against the pull of a spring balance. When the pull becomes too strong the muscles give with a sudden "break" and at this instant the scale is read and the number of pounds or ounces are recorded on a card.

The accuracy of the test depends upon a well-trained team of workers, consisting of an operator and an assistant, who are usually women. The operator is responsible for the correct position of the patient. She steadies the part to be tested and gives the word when the assistant is to pull and the patient is to hold. The pull of the assistant is through a spring balance which is attached to the patient by means of a cuff.

In this way twenty-two different muscle groups are tested on each side of the body: ten in the lower extremity, twelve in the upper. It is to be noted that the method only indicates the power of *groups* of muscles and not of individual muscles. It is really a record of the power of abduction, adduction, flexion, and extension, etc.

Standard positions are assumed for each muscle group, and the value of the test consists in the possibility of duplicating exactly the conditions of the first test at succeeding ones, so that a definite idea of gain or loss in muscle strength can be registered.

In order that one may know whether the power found in a given muscle group is normal or not, it is necessary to know the average normal strength of that group and the variations according to age, and so a table of standards has been worked out on normal,

healthy children of every age for each of the twenty-two muscle groups to be tested.

Children under the age of four or five cannot be tested as a rule, and there is no satisfactory method of testing the muscles of the abdomen, back, and neck, or those of rotation. Thus there are limitations to the method, especially when one adds that very weak muscles do not give a reading.

The time required for a complete examination is about one hour and depends largely upon the skill of the operators and the docility of the patient. The accuracy of the tests depends entirely upon the skill of the operators, but so great is the personal equation that two well-trained teams examining the same patient would be liable to give results showing considerable variations. Consequently it is necessary whenever possible to have the same team examine the same patient on every occasion. It takes at least a month of steady work to train a team of workers to any degree of proficiency.

The apparatus is simple and inexpensive and consists chiefly of three sizes of accurate spring-balance scales, and a few clamps, etc., for steadying the patient. A solid table is also a requisite.

CASE OF VAQUEZ'S DISEASE

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THE patient came to the Royal Victoria Hospital under Dr. C. F. Martin's service on August 9th, 1916, complaining of pain in left side under rib margin, constipation, and gastric pain after eating. There was an increasing weakness and an extreme degree of drowsiness, the patient sleeping most of the time. There was an extremely flushed condition of skin which patient says has lasted over thirty years, and a spleen which has been enlarged for at least ten years. His attention was first called to his spleen by his physician and since that time he has noticed that it has slowly increased in size. He gave a history of gastric hæmorrhage

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